# What's Right and What's Wrong with the SAT: Predicting Academic Achievement in a Selective University

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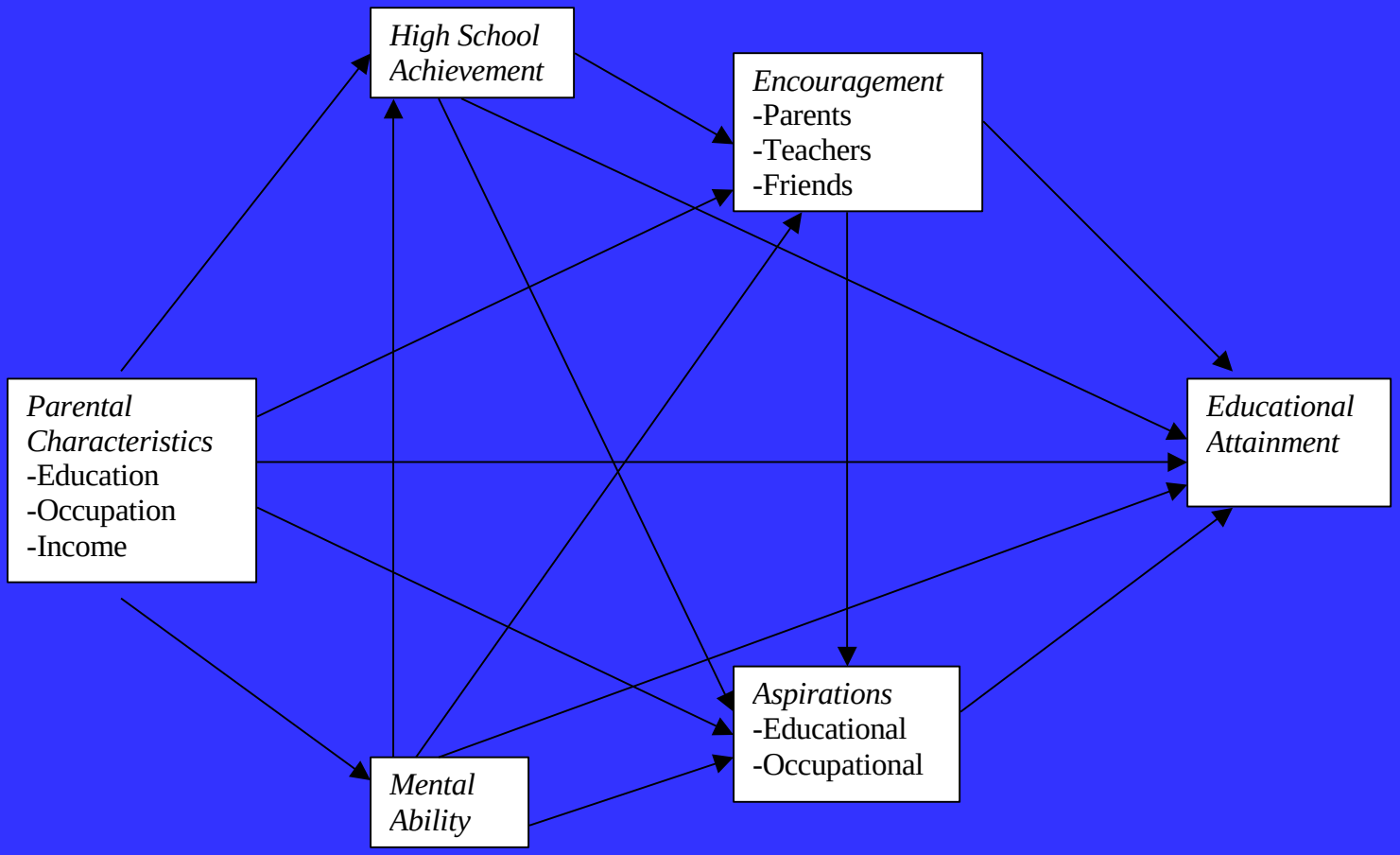
Presented at the 2003 Midwestern Regional Meeting

of the College Board – Chicago, IL

# Some Factors Affecting College Academic Achievement

- Resources (financial/personal)
- Effort (quantity and quality)
- Social Support Network
- Characteristics: abilities, interests, values
- Type of college attended
- Motivation, Aspirations, Preferences
- Cognitive and personal development
- Academic integration

***General Model of Educational Attainment***
*-adapted from Blau and Duncan (1967) and Sewell and Hauser (1975)*



*Many people are unaware of how few colleges and universities have enough applicants to be able to pick and choose among them. There is no single, unambiguous way of identifying the number of such schools, but we estimate that only about 20 to 30 percent of all four-year colleges and universities are in this category. Nationally, the vast majority of undergraduate institutions accept all qualified candidates…*

Bowen and Bok, 1998
*The Shape of the River*

# What Selective College Admissions Officers Consider:

- Prior achievement
- Standardized test performance
- Special talents; awards; prizes
- Extracurricular activity; Leadership; Community service
- Contribution to diversity (e.g., geography)
- Goals and purposes

# College Entrance Testing Facts

- About 85% of colleges and universities require admissions test of applicants.
- In 2002, 1.3 million high schools students took the SAT; 1.12 million took the ACT
- SAT and ACT cores are highly correlated (r=.90) *Dorans, 1998*

# Content Comparison Across ACT and SAT I Component Scores

| | | | | | | |
|---|---|---|---|---|---|---|
| **SAT I Verbal** | Critical Reasoning | Analogies/Sentence Completion | | | | |
| **SAT I Math** | Arithmetic Reasoning | Algebraic Reasoning | | Geometric Reasoning | | Miscellaneous Math Reasoning |
| **ACT Math** | Pre-Algebra | Elementary Algebra | Intermediate Algebra | Coordinate Geometry | Plane Geometry | Trigonometry |
| **ACT English** | Usage/ Mechanics | Rhetorical Skills | | | | |
| **ACT Reading** | Prose Fiction | Humanities | | Social Science | Natural Science | |
| **ACT Science Reasoning** | | | | Research Summaries | Conflicting Viewpoints | Data Representation |

from Dorans (1999)

# What's Right with the SAT

- High school grades subject to variability and grade inflation, so an objective measure is desirable
- Provides a nationwide basis for comparing educationally related knowledge attainment
- Complement to high school grades; together are more predictive of college achievement than either is alone *(Willingham, 1998)*

- Tests provide an efficient source of comparative information for which there is currently no substitute
- Tests can be provided at relatively low cost and offers efficiencies to institutions that must review thousands of applicants
- Test provide students with an opportunity to demonstrate talent (e.g., late bloomers)

*Board on Testing and Assessment, National Research Council, 1999*

# What's wrong with the SAT?

- Lemann: creates and perpetuates a myth of ability ranking from top to bottom
- Sacks: rewards passive, superficial learning; drives instruction in undesirable directions; highly correlated with SES; questionable validity
- FairTest: biased assessment; mean score differences (e.g., by gender or race)

- External rather than classroom based
- Multiple choice and not performance based
- MC is inauthentic and not representative
- Creates extra stress (special event testing)
- Invites overuse of a single score
- Overemphasizes factual recall (factoids)
- Disadvantages minority/poor students

*Elbel (2003)*

- Atkinson:
  - Originally intended to measure aptitude rather than mastery
  - Test performance appears to be coach-able
  - Little or no relationship to programs of study
  - Invites use quantitative formulae rather than holistic assessments
  - Perceived to be unfair, particularly by minority parents (re: no information on how to improve)

# Research Questions

- How do the relationships between high school grades, test scores and college grades compare across racial groups?
- Are high school grades a better predictor of college achievement than test scores?
- Do the predictor-criterion validity coefficients have the same meanings across racial groups? (Helms, 1992)

# Study Parameters

- Relies on institutional data sources
- Students are in-state residents who enrolled as first time matriculants for the fall terms of 1991 through 2000.

# Variables

- FGPA

- HSGPA
- SAT score
- Household Income
- Gender
- Race

# Social Capital:

-social networks; family; friends; co-workers, colleagues; college roommates; professional acquaintances; community ties.

- powerful resource for achieving occupational advancement, social status, and economic rewards.

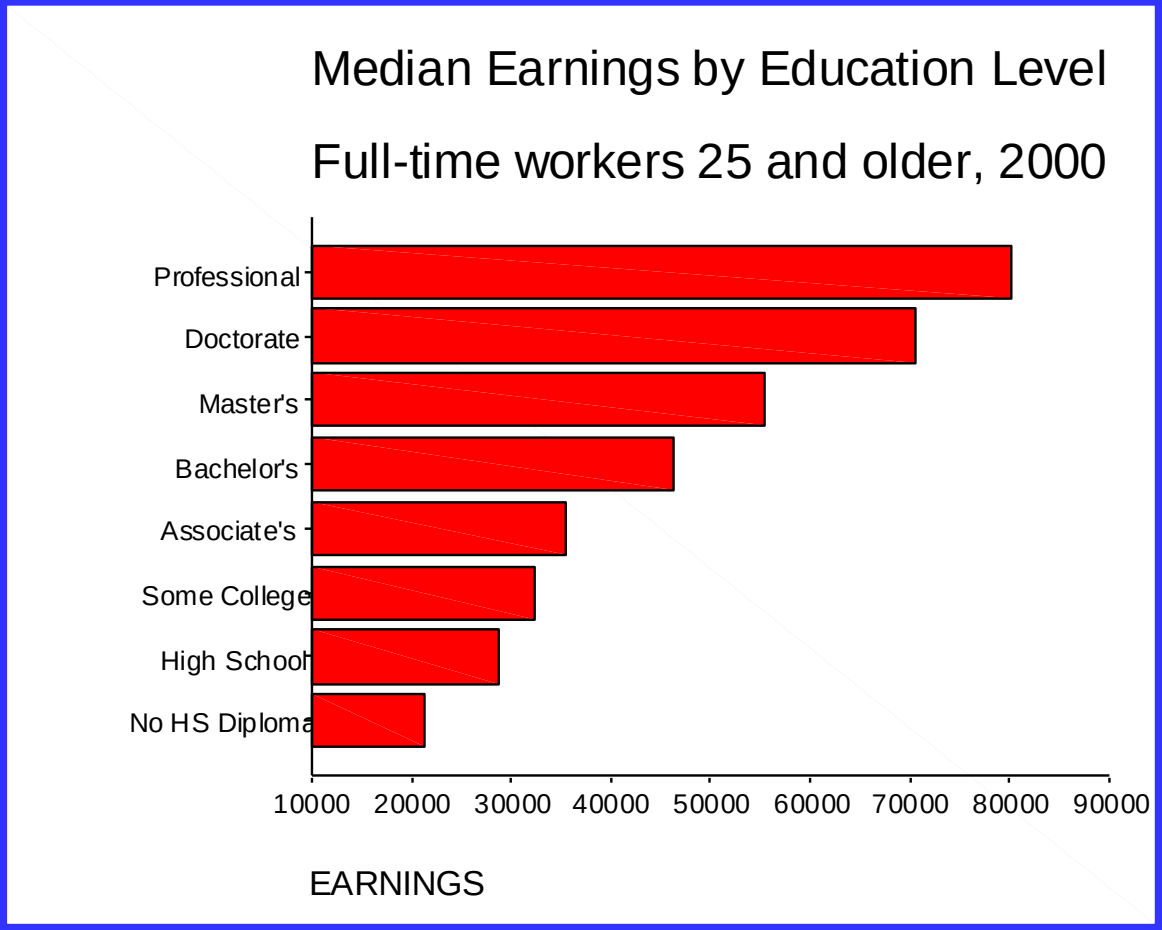
-community-based resources

# Social Capital:

- Where one lives is an indicator of social capital. People who live in poverty areas have fewer social ties, but also the ties they have tend to be of less social worth as measured by the social position of their partners, siblings, and friends. In short they possess less volume of social capital. In contrast people who live in wealthier communities have greater volumes of social capital.

*R. Putnam,*

*Bowling Alone (2000)*



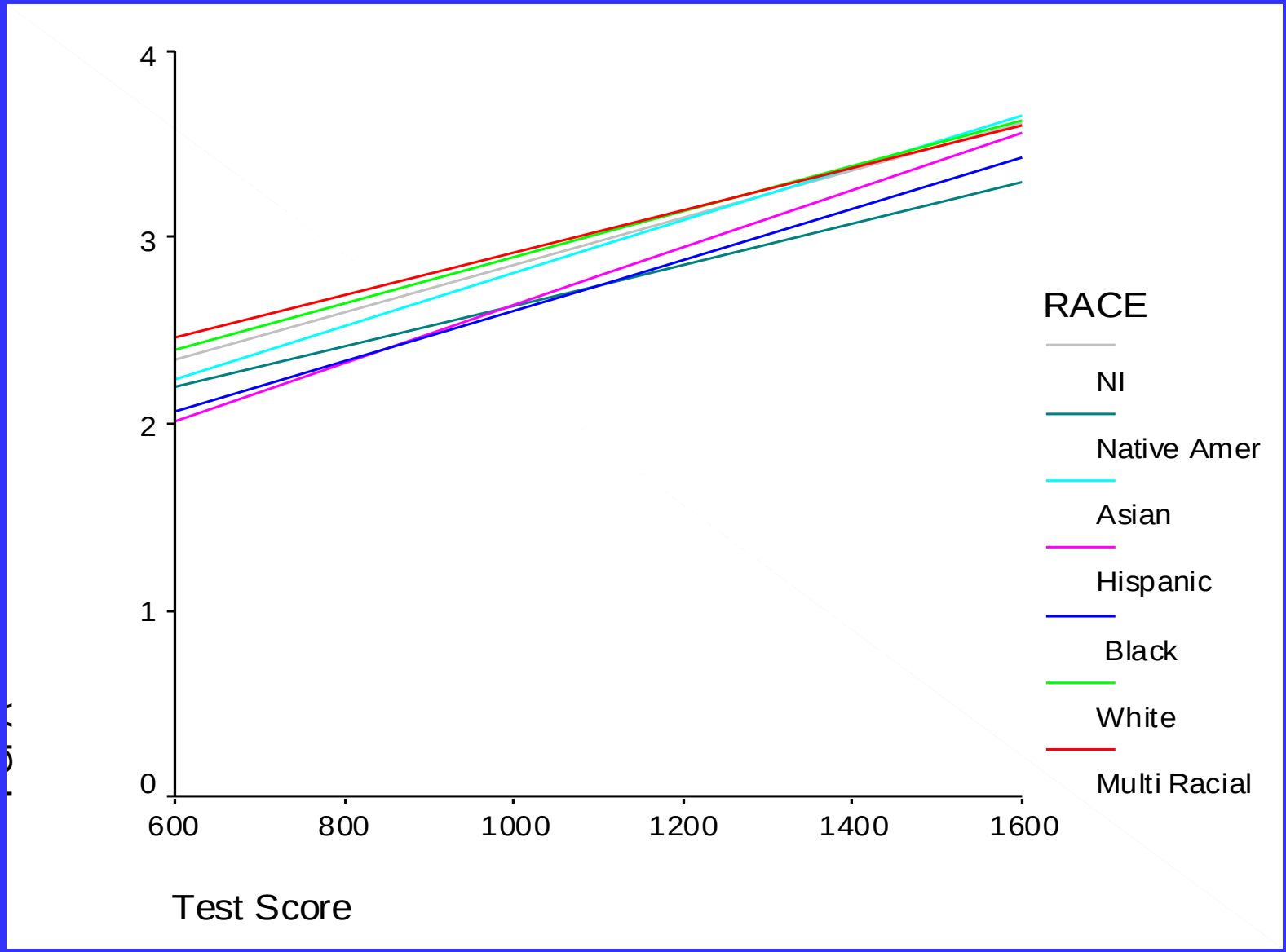

US Bureau of Labor Statistics

Pearson correlation coefficients for academic achievement variables by race (coefficients for whites appear above the diagonal) .

| | HSGPA | SAT | HHI | FGPA |
|---|---|---|---|---|
| **HSGPA** | | .281 | -.136 | .323 |
| **SAT** | .281 | | .019 | .296 |
| **HHI** | -.006 ns | .245 | | .070 |
| **FGPA** | .248 | .308 | .159 | |

Table 1. Pearson correlation coefficients for the relationship between FGPA and three predictor variables by ethnic group.

| N | Group | HSGPA | SAT | HHI |
|---|---|---|---|---|
| 19,909 | White | .323** | .296** | .070** |
| 2,490 | Black | .248** | .308** | .159** |
| 921 | Hispanic | .357** | .350** | .112** |
| 3,021 | Asian | .375** | .353** | .061** |
| 233 | Am. Indian | .299** | .208** | .053 ns |
| 861 | Multi Racial | .071* | .267** | .084* |
| 490 | Not Included | .298** | .296** | .089* |


4
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Asian
Hispanic
Black
White
Multi Racial

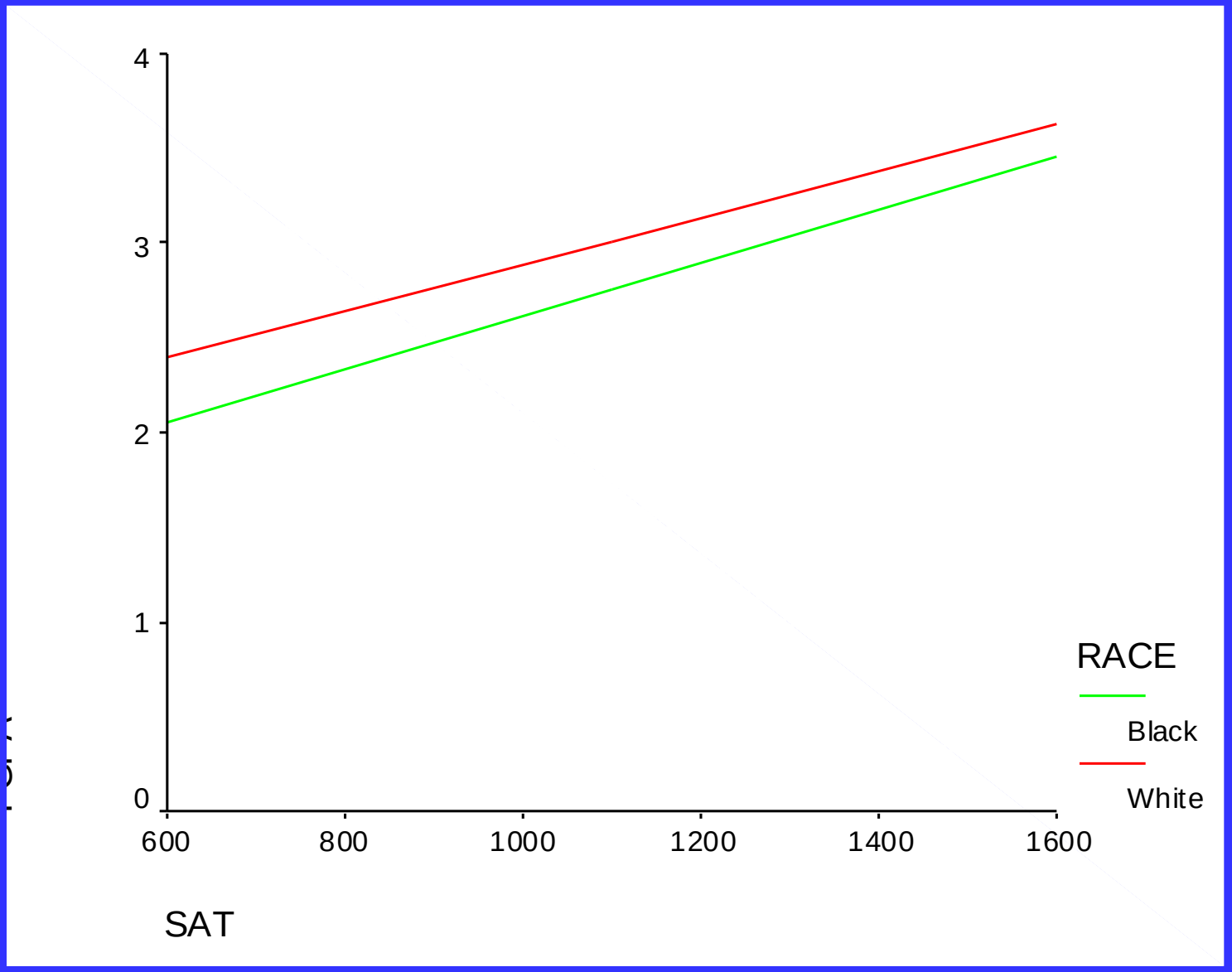
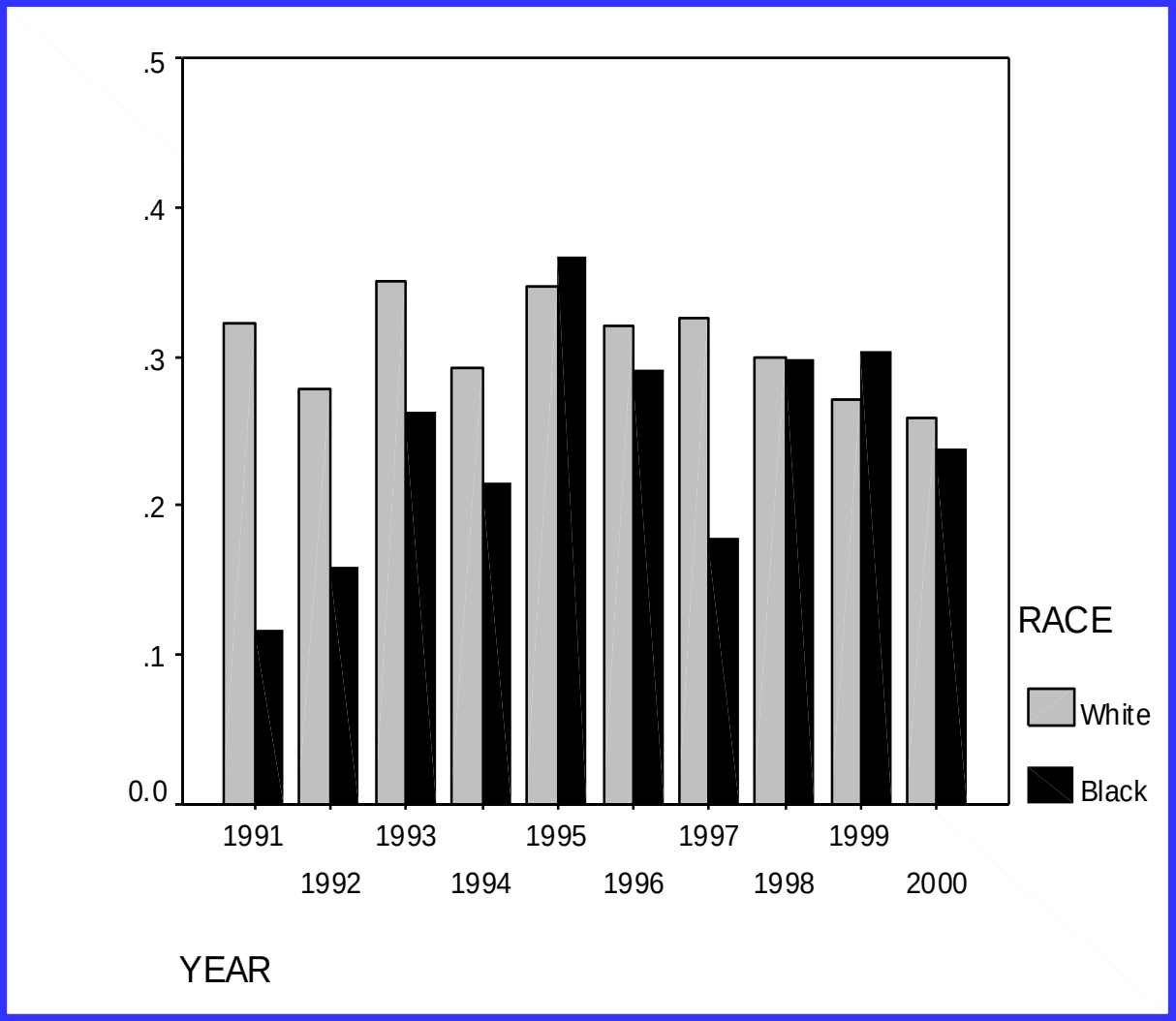

4
3
2
1
0
600
800
1000
1200
1400
1600
SAT
RACE
Black
White

Table 2 – Study Participants: Students who were Michigan residents for the ten-year period 1991-2000 by Race.

| Year | Black | White | Total |
|---|---|---|---|
| 1991 | 245 | 1,894 | 2,139 |
| 1992 | 185 | 1,580 | 1,765 |
| 1993 | 257 | 1,856 | 2,113 |
| 1994 | 270 | 1,794 | 2,065 |
| 1995 | 293 | 2.070 | 2,363 |
| 1996 | 258 | 2,005 | 2,263 |
| 1997 | 248 | 2,437 | 2,688 |
| 1998 | 230 | 2,188 | 2,418 |
| 1999 | 200 | 2,151 | 2,351 |
| 2000 | 300 | 1,945 | 2,249 |
| **Σ** | **2,490** | **19,920** | **22,410** |

How do the relationships between high school grades, test scores and college grades compare across racial groups?


.5
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YEAR
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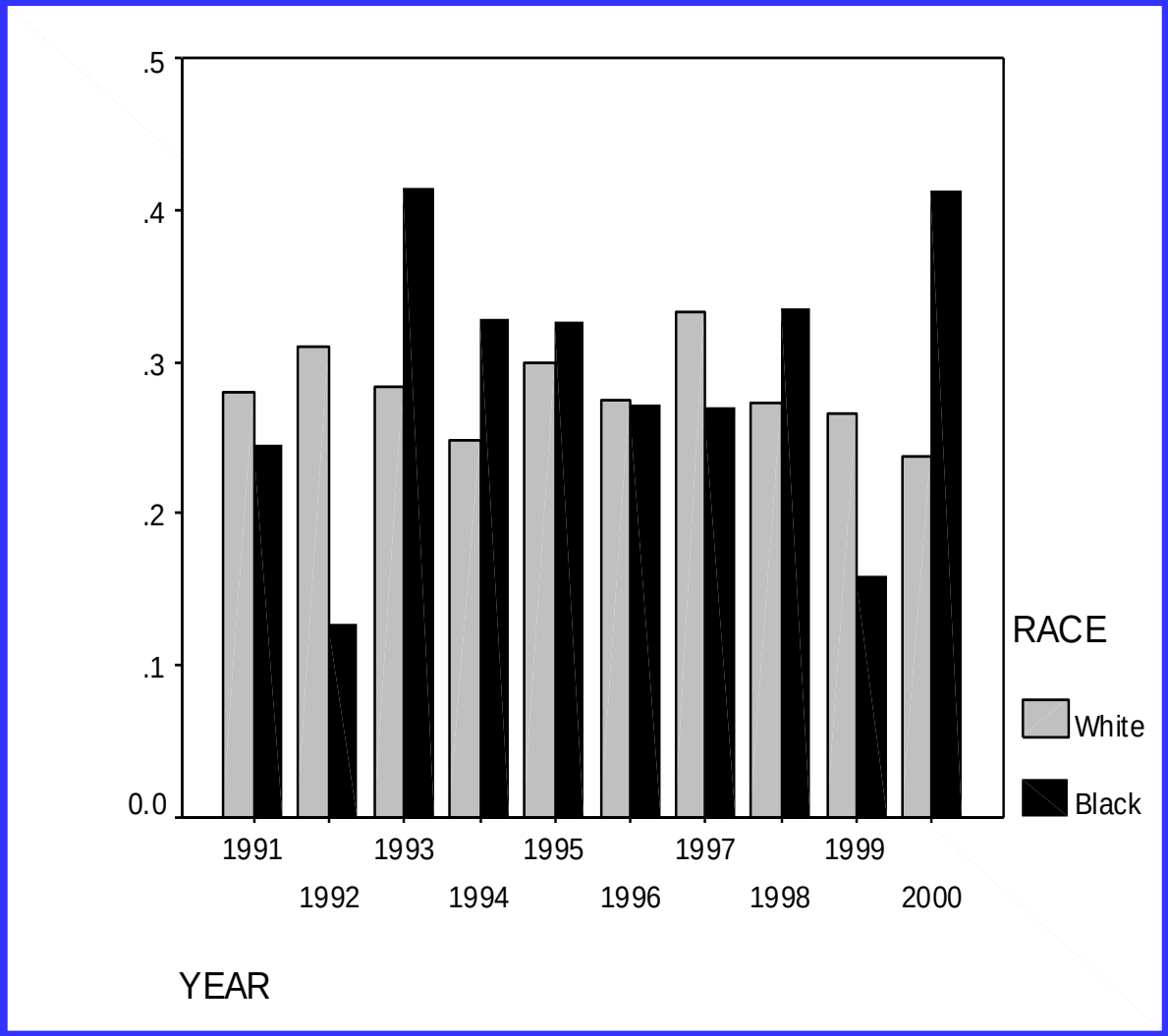
White
Black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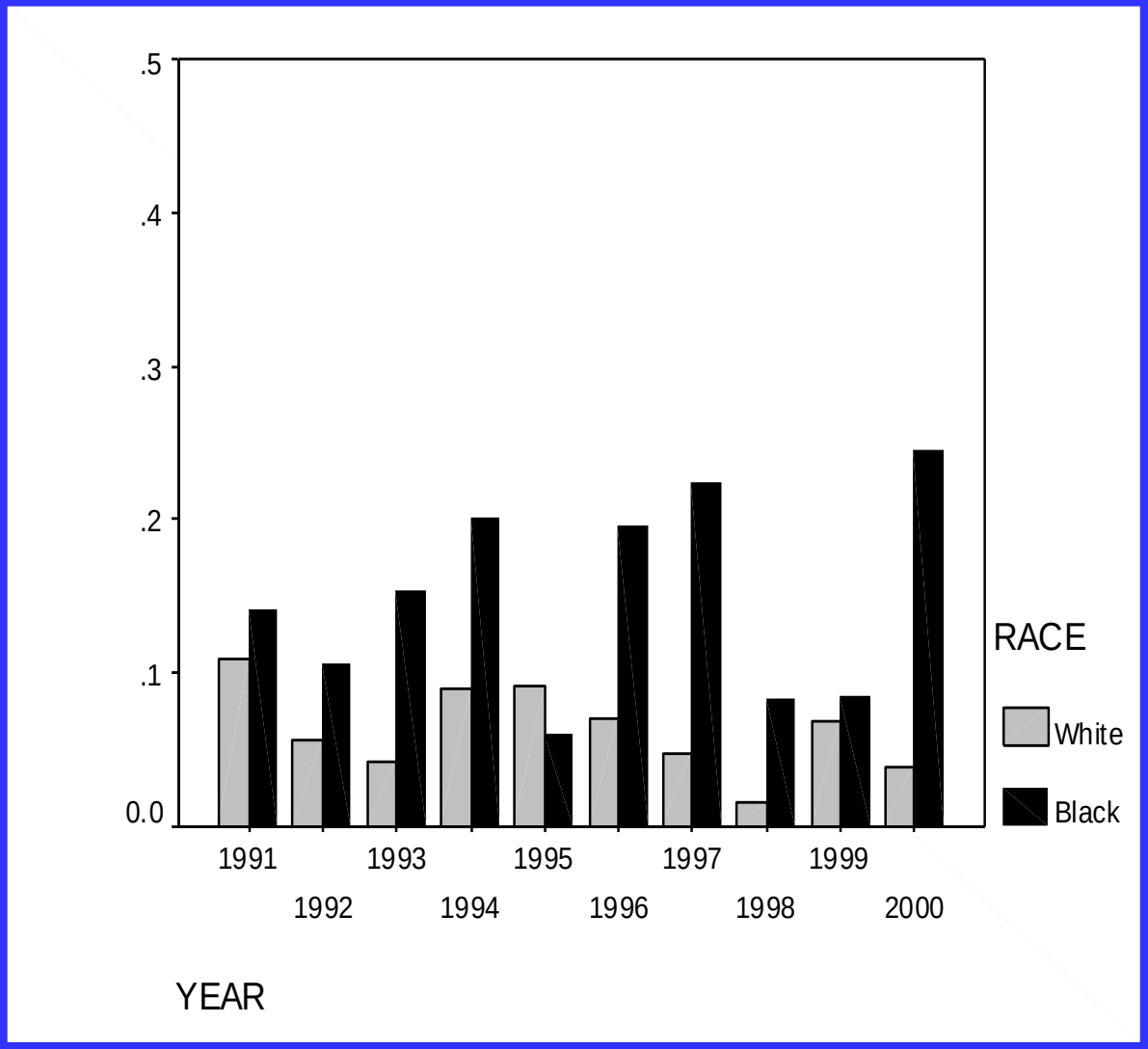
2000
YEAR
RACE
White
Black


.5
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1991
1992
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2000
YEAR
RACE
White
Black

Are high school grades a better predictor of college achievement than standardized test scores?

# Stepwise regression model summary for FGPA as dependent variable

## White Students

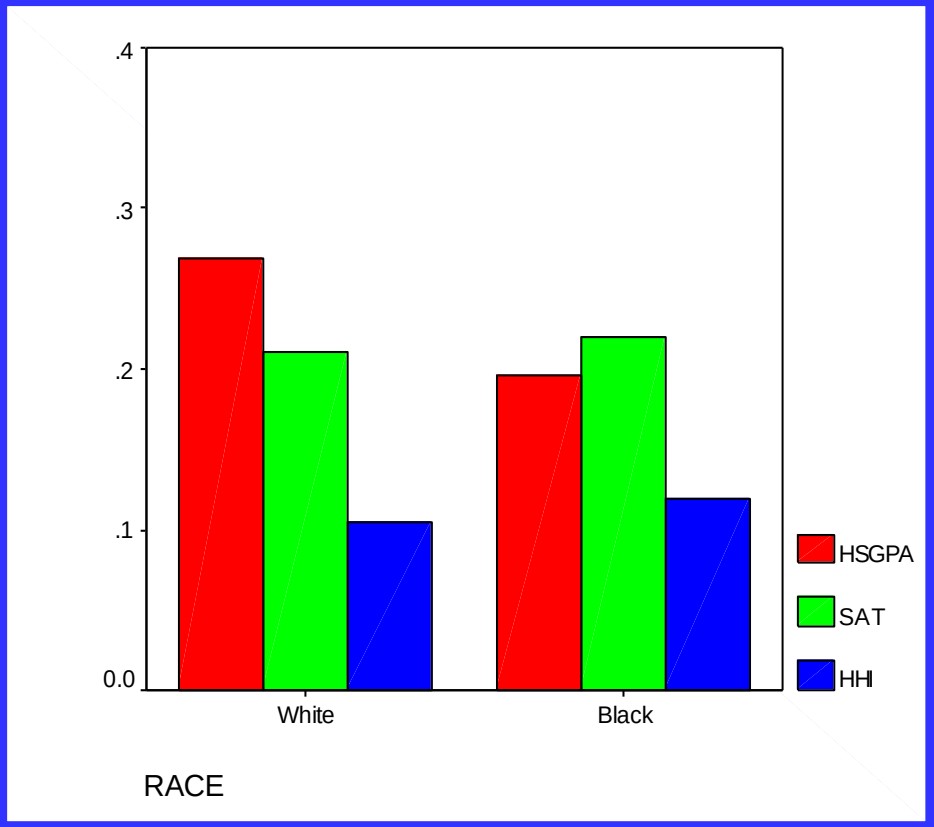
| | R | $R^2$ | se | $R^2$ change | F change |
|---|---|---|---|---|---|
| HSGPA | .323 | .105 | .527 | .105 | 2,320 |
| SAT | .388 | .150 | .513 | .046 | 1,072 |
| HHI | .401 | .161 | .510 | .011 | 249 |

**R=.401 $R^2$ = .161; df: 1 and 19,883; *p<.001* for each step**

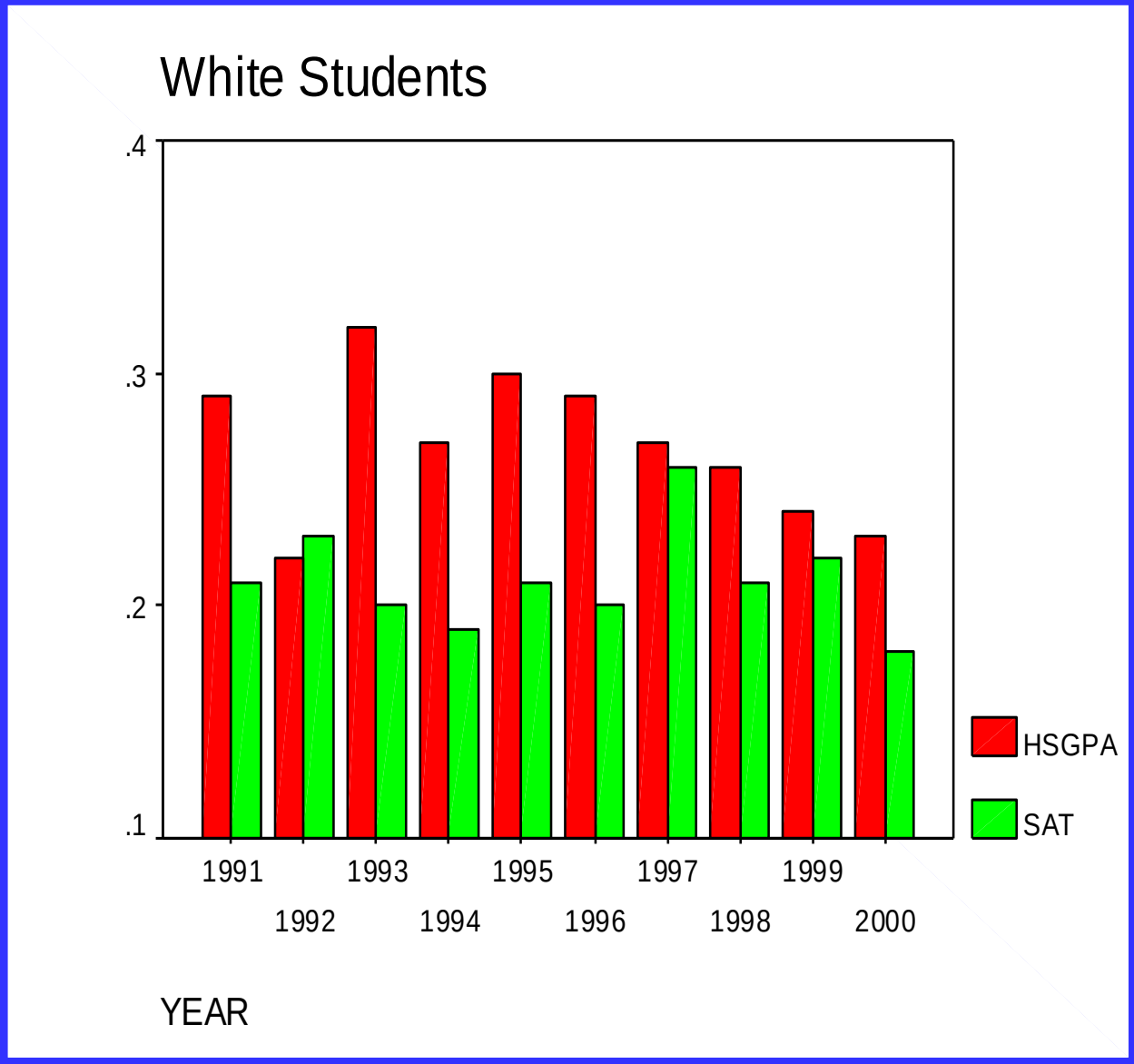
## Black Students

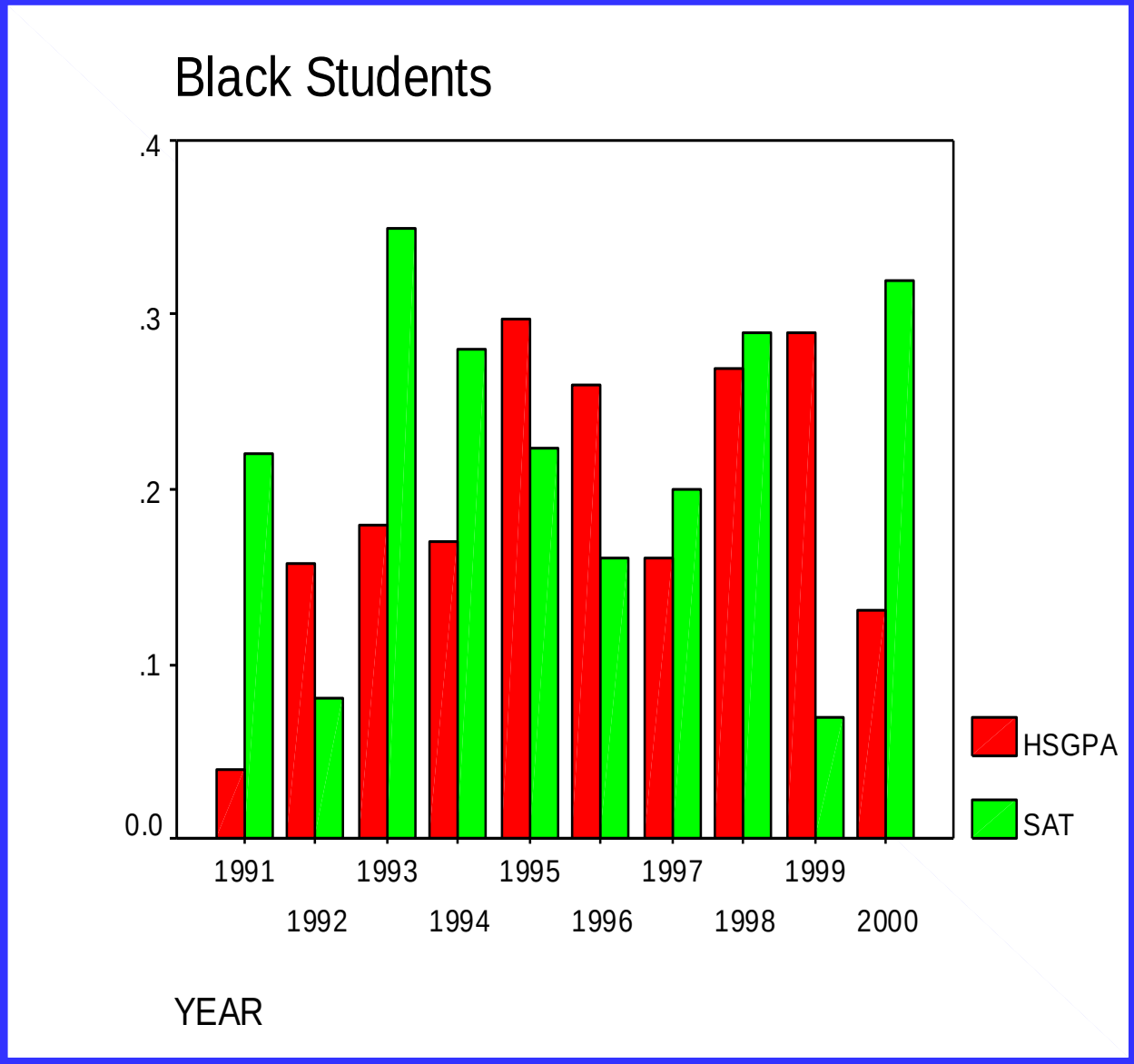
| | | | | | |
|---|---|---|---|---|---|
| SAT | .308 | .095 | .66 | .095 | 261 |
| HSGPA | .352 | .124 | .655 | .029 | 81 |
| HHI | .366 | .134 | .651 | .010 | 29.8 |

**R=.366 $R^2$=.134; df: 1 and 2,484; *p<.001* for each step**

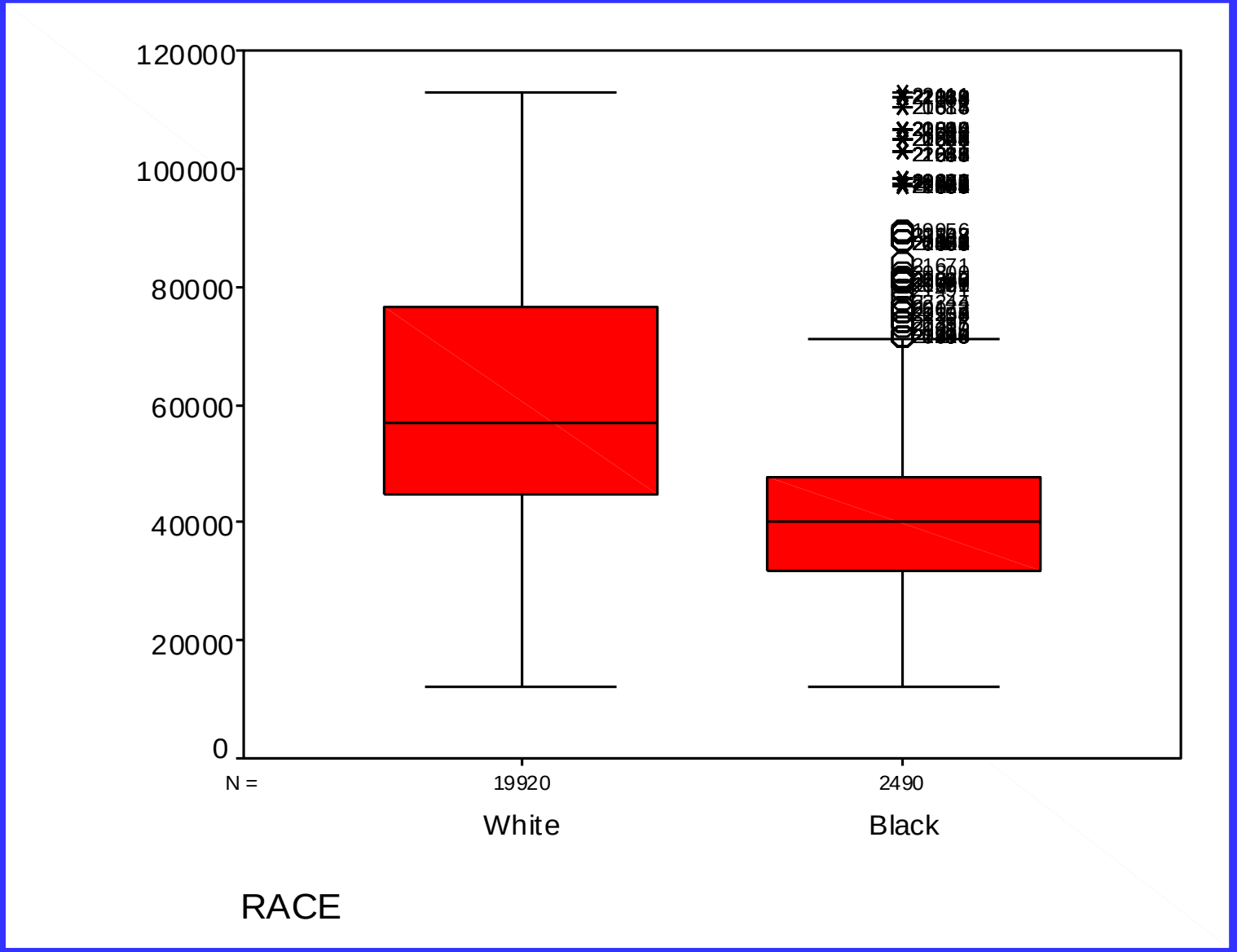



| | F | df | *p.* | R | $R^2$ |
|---|---|---|---|---|---|
| **White** | **1,382** | **3; 22,131** | **.001** | **.397** | **.158** |
| **Black** | **146** | **3; 2,849** | **.001** | **.365** | **.132** |


White Students
.4
.3
.2
.1
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
YEAR
HSGPA
SAT


Black Students
.4
.3
.2
.1
0.0
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
YEAR
HSGPA
SAT

Do the predictor-criterion validity coefficients have the same meanings across racial groups?


120000
100000
80000
60000
40000
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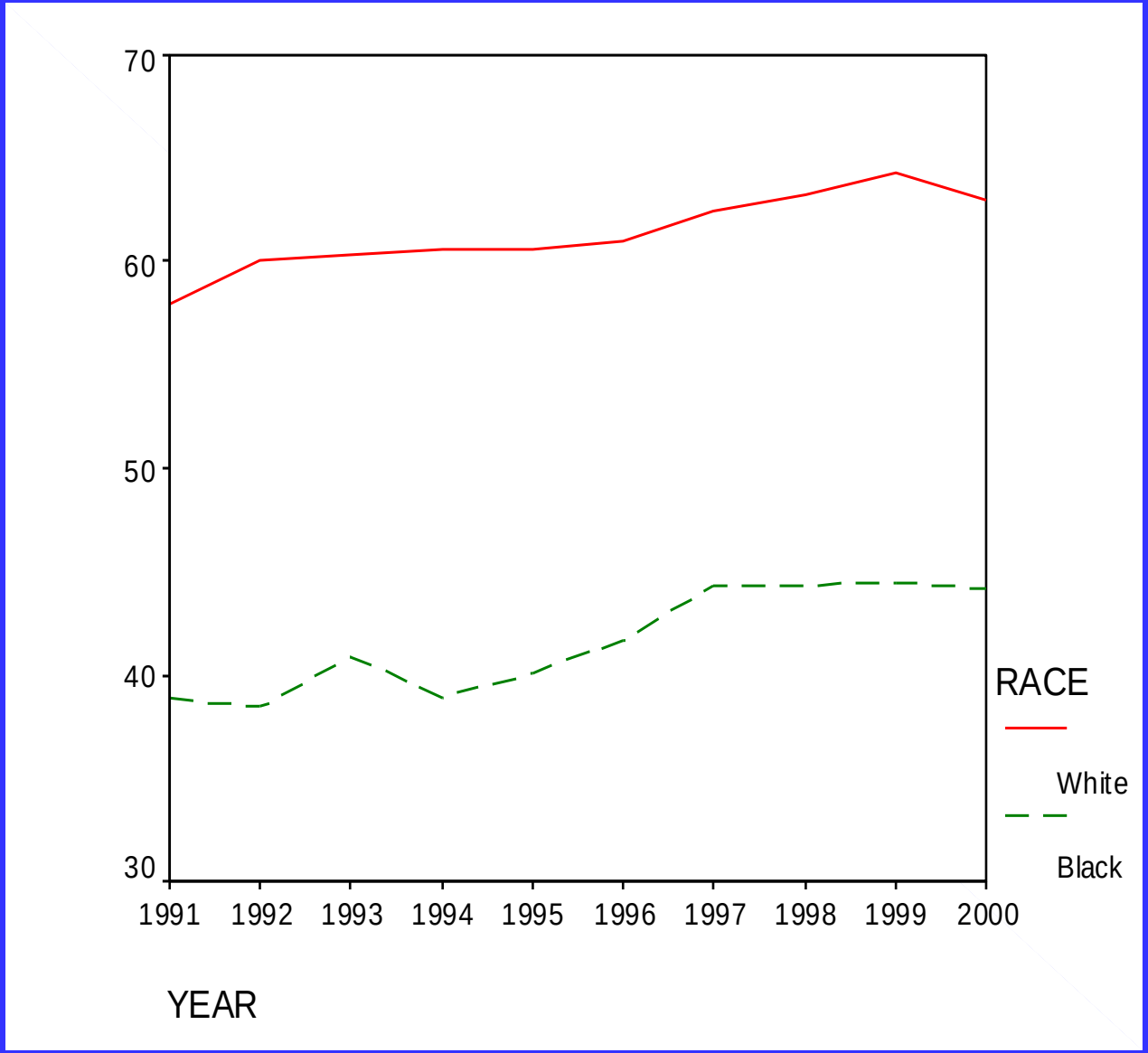
0
N =
19920
2490
White
Black
RACE


70
60
50
40
30
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
YEAR
RACE
White
Black

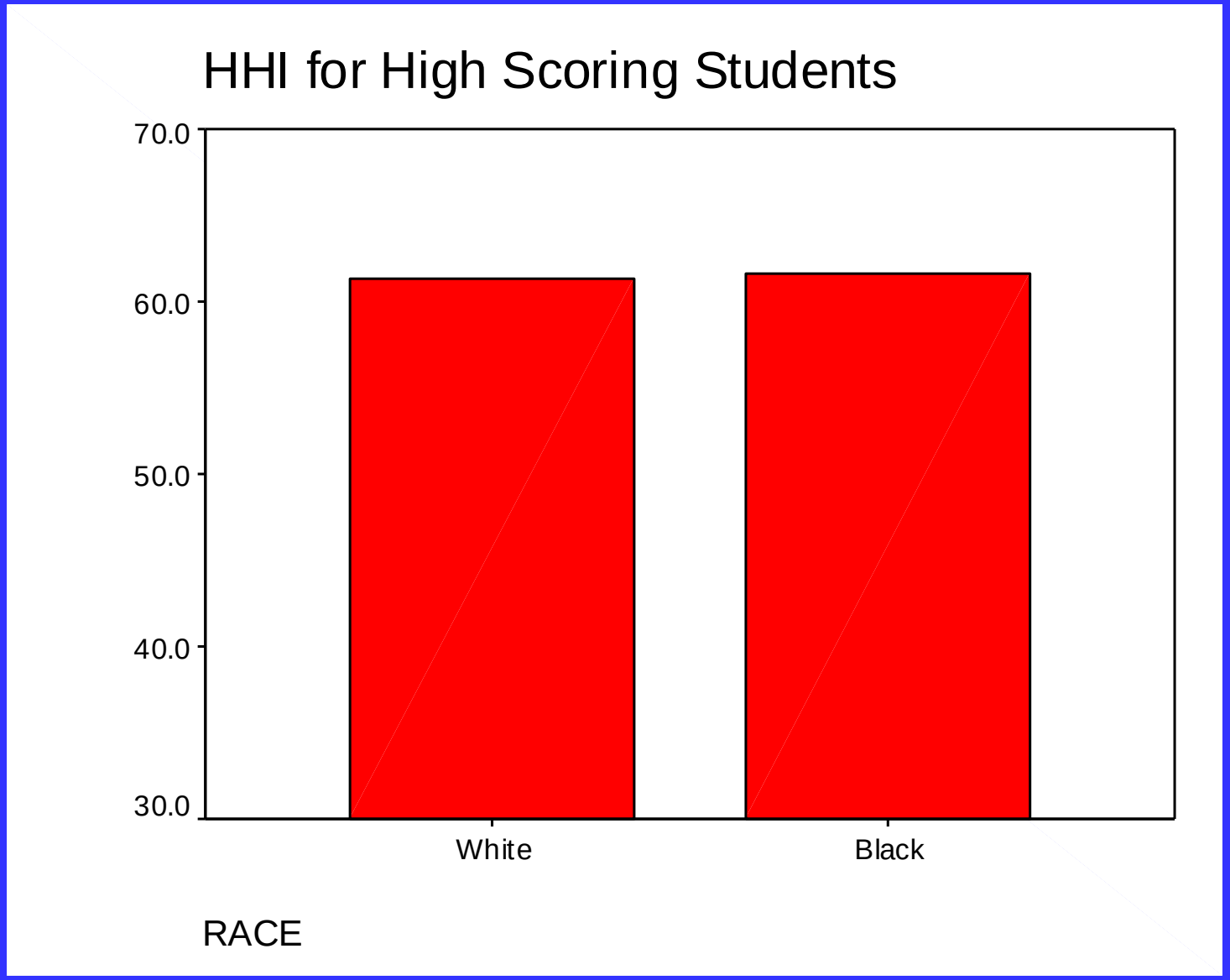
# (SAT)(HHI).(HSGPA)

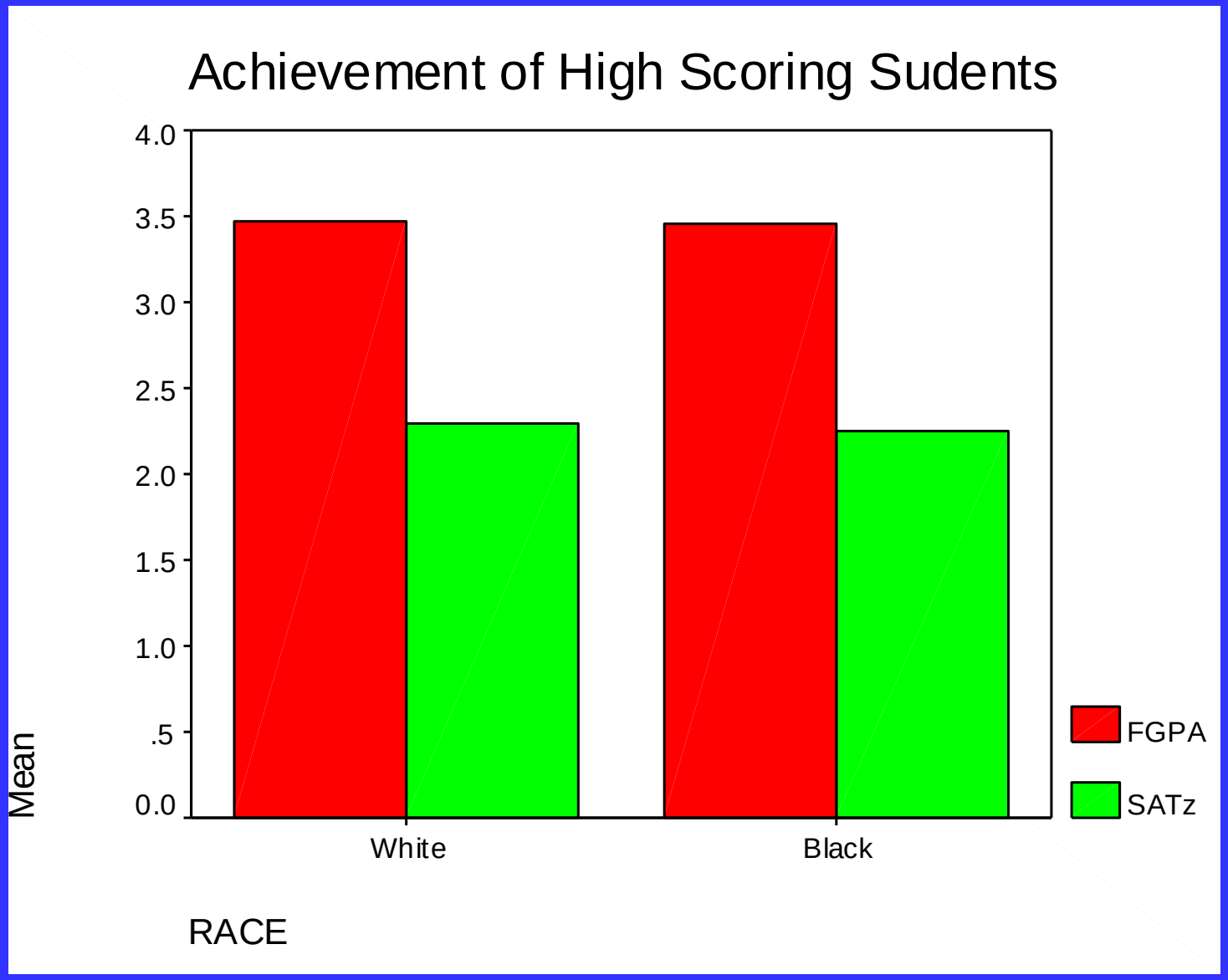
Whites: = .061 *

Blacks: = .257**

# Standard vs.“Corrected” SAT scores

| | Standard | Corrected |
|---|---|---|
| Average Black (HSGPA=3.4) | 1060 | 1103 |
| Excellent Black (HSGPA=4.0) | 1179 | 1221 |


HHI for High Scoring Students
70.0
60.0
50.0
40.0
30.0
White
Black
RACE


Achievement of High Scoring Sudents
4.0
3.5
3.0
2.5
2.0
1.5
1.0
.5
0.0
Mean
White
Black
RACE
FGPA
SATz

# Summary

- HSGPA was strongest predictor of FGPA for white students, while SAT was strongest predictor of FGPA for Black students.
- HHI moderated SAT performance and the influence was greater for black students.
- Consistent with Helms (1992) the equivalence of coefficients is challenged.

# Conclusions

- Standardized test scores provide useful information, but insufficient by themselves.
- How we choose to use standardized test score information is the real challenge.
- We must be careful to recognize limitations of test scores and not to reify them.

- The real problem with standardized test scores is our willingness to rely upon a single number as a gauge of complex human behavior.

***General Model of Educational Attainment***
*-adapted from Blau and Duncan (1967) and Sewell and Hauser (1975)*